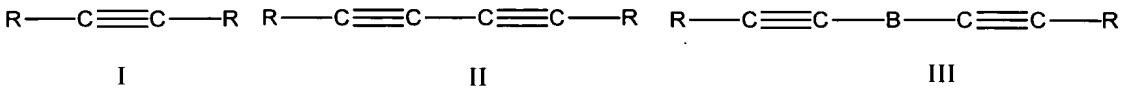
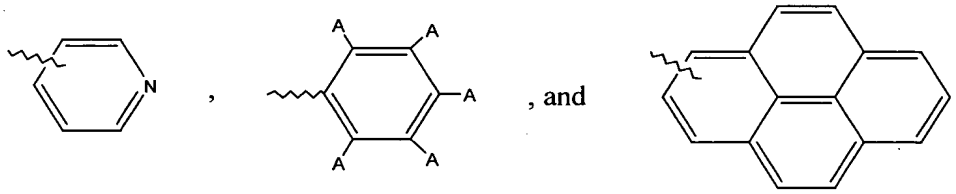
What is claimed is:

1. A conducting molecule according to Formula I, II, or III:



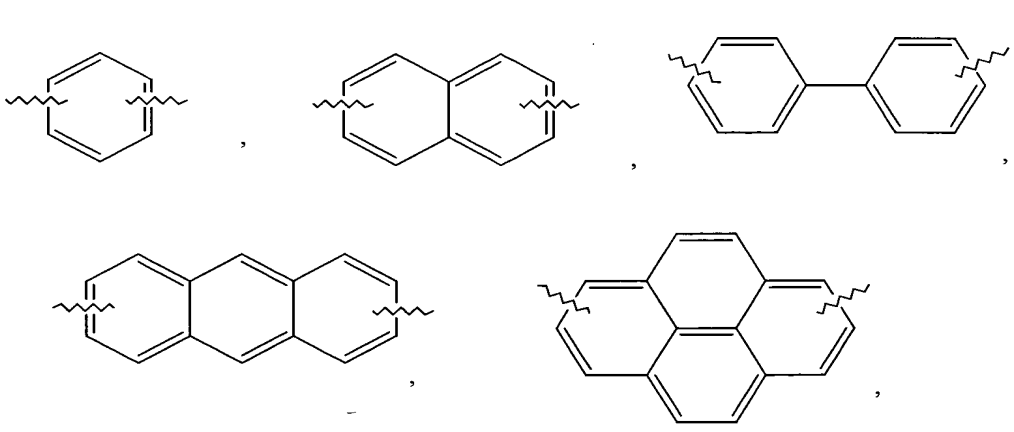
I II III

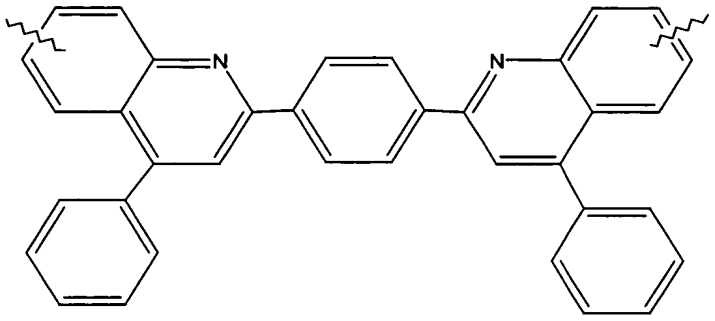
wherein R is independently selected from the group consisting of:

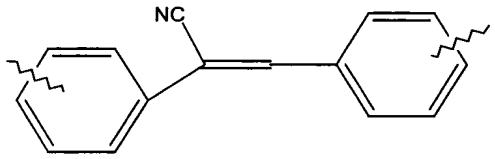


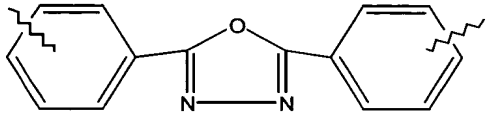
wherein A is independently selected from the group consisting of H, a C1-C6 alkyl group, F, -CN, and -S-C(=O)-CH_3, wherein at least one of F, -CN, and -S-C(=O)-CH_3 is present;

and B is selected from the group consisting of:

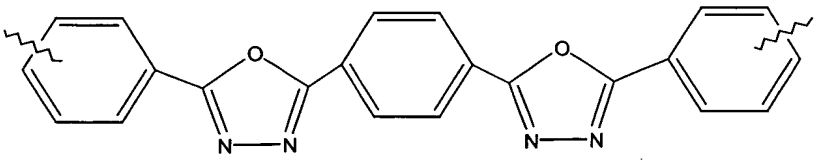








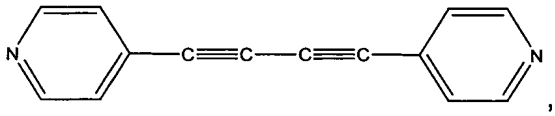
and



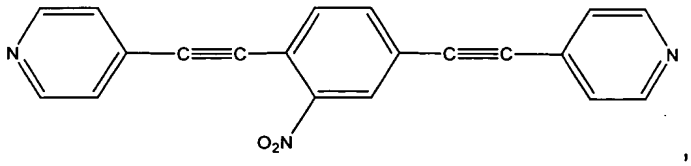
wherein B is optionally substituted with H, a C1-C6 alkyl group, F, -CN, -NO_2, and -S-C(=O)-CH_3.

2. A conducting molecule according to Claim 1 selected from the group consisting of:

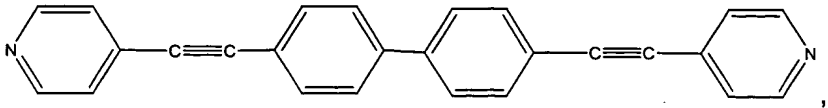
(a)



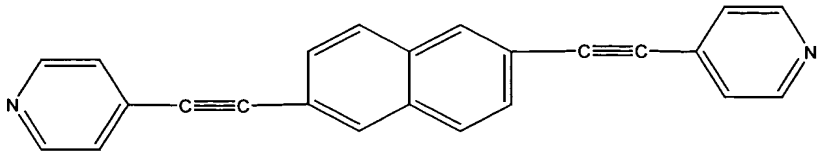
(b)



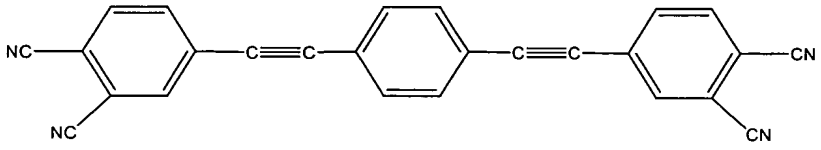
(c)



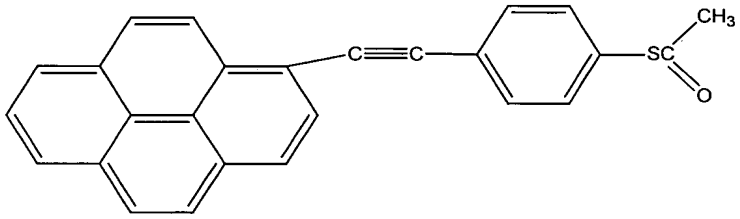
(d)



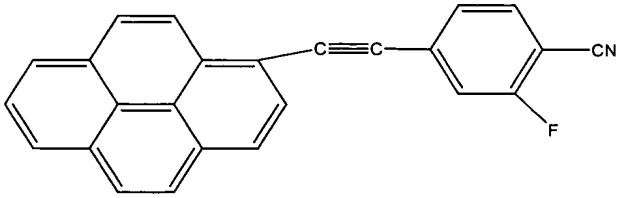
(e)



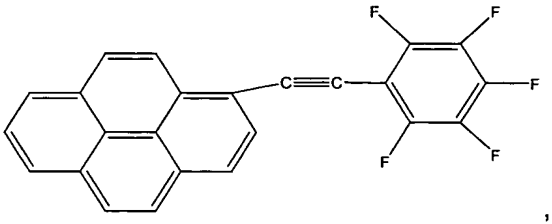
(f)



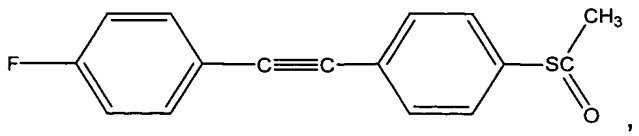
(g)



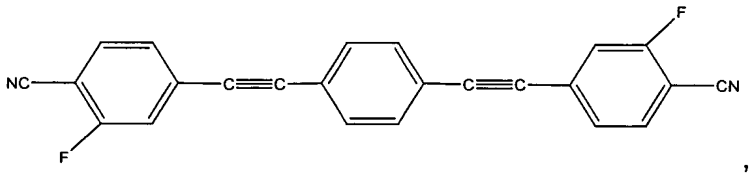
(h)



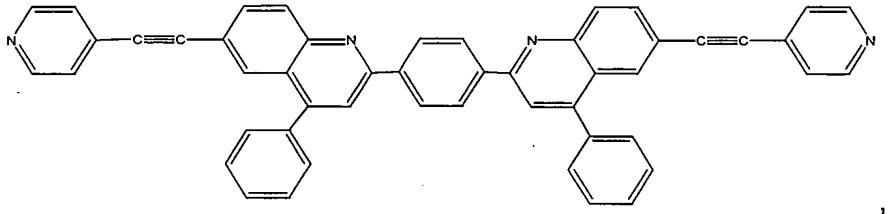
(i)



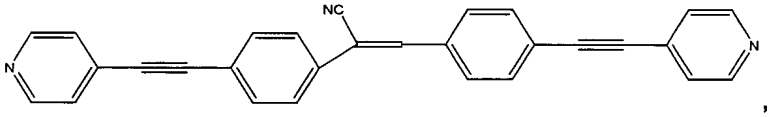
(j)



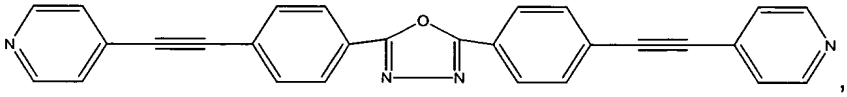
(k)



(l)

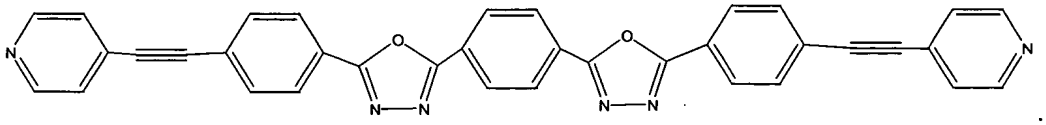


(m)



and

(n)



3. A molecular based memory system, molecular wire, or molecular switch, comprising a composition or either of Claim 1 or Claim 2.

4. A process for synthesizing a supramolecular structure comprising the steps of:

(a) providing a conducting molecule of any of Claims 1 or 2;

(b) providing a suitable substrate;

(c) contacting the conducting molecule of (a) with the substrate of (b) wherein the conducting molecule is immobilized on the substrate;

(d) contacting the immobilized conducting molecule of (c) with a redox or photochemical reagent under conditions wherein the immobilized conducting molecule is activated; and

(e) contacting the activated conducting molecule with the conducting molecule of step (a) wherein molecular addition takes place and a supramolecular structure is formed.

5. A process according to Claim 4 wherein steps (d) and (e) are optionally repeated.

6. A process according to Claim 4 wherein the substrate is selected from the group consisting of silicon wafers, synthetic polymer supports, glass, agarose, nitrocellulose, nylon, nickel grids or disks, carbon supports, aminosilane-treated silica, polylysine coated glass, mica, and semiconductors.

7. A supramolecular structure synthesized by the process of Claim 4.

8. A sensor comprising a supramolecular structure synthesized by the process of Claim 4.